REMARKS

On page 2 of the Office Action, the Examiner rejected claims 4, 5, 6, 9, 15, 16, and 17 under 35 U.S.C. §102(b) as being anticipated by the Root patent.

The Root patent discloses a GPS-based personal performance monitor and feedback device 101 that includes input buttons 115 to set a user's personal data and preferences and to input feedback options and targets, and a display 112 that displays various data. A GPS receiver antenna 301 (Figure 3) is plugged into a connector 109 using a plug 122, and a set of audio headphones 202 (Figure 2) is plugged into a connector 108 using a plug 120. A button 102 turns the device 101 on and commences an initialization process. An LED status indicator 111 indicates device initialization, and a lock/light button 110 locks programmed settings. A pause/position button 104 temporarily pauses collection of performance data or, if held for a longer period of time (such as 2 seconds), temporarily replaces the radio band and frequency data on the display 112 with the latest latitude and longitude position. A "Now!" button 105 initiates updating of the latest measures of athletic performance. Atmospheric pressure is measured by a barometric pressure sensor 610 (Figure 6).

The device 101 can be hooked to a user's belt or waistband, strapped around the user's upper arm, or simply held by the user.

Figure 6 is an electrical schematic of the device 101. A CPU 602 controls the operation of the device 101 and is connected to a GPS receiver 604, an AM/FM/TV radio receiver 607, an audio module 606, a memory 608, input controls 603, the barometric pressure sensor 610, a display 605, a heart rate sensor 611, a body temperature sensor 612, a modem 613, a serial-type port 118, an infrared-type port 124, and an external personal computer 701. The GPS receiver 604 is connected to the antenna 301.

Figure 10 shows configuration menus for the device 101. The main menus are designated as "exercise session type", "pre-set course", "performance targets", "information cycles", "user data", and "system set-up".

The user turns on the device 101 and sets user preferences using the menu control buttons 115 and the display 112. Preference options include performance targets, frequency of feedback information cycles, level feedback detail, and personal user data as shown in the menus of Figure 10.

Once the GPS receiver 604 confirms by way of the display 112, the LED status indicator 111, or an audible signal that a reliable geographical position fix is acquired, the user presses the start button 103 and commences an exercise session. The GPS receiver 604 continuously determines the latitude and longitude coordinates of the user's current position as well as the user's current speed and direction of travel, and stores this data in the memory 608 along with other information such as the date and time that each position is acquired. Performance data is calculated from this information. Recommendations to increase or decrease the level of effort to meet pre-set performance targets are then determined.

At pre-set intervals, the performance data is provided to the user through the set of audio headphones 202 by way of the audio module 606 or through the display 112. Alternatively, the user can immediately call up this performance data by pressing the "Now!" button 105. Monitoring can be temporarily suspended by pressing the pause/position button 104 and can be resumed by pressing the start button 103.

The measured parameters such as average speed and pace, exercise type, average sustained heart rate,

elapsed distance and time, and so forth can be optionally used to automatically verify that an exercise session has actually occurred.

The device 101 can provide a total health monitor based on sensors such as a heart rate sensor or body temperature sensor, and can provide a way for scientists and medical researchers to accurately and consistently monitor a group of individuals and study the long term relationship between exercise and health.

Independent claim 4 recites a motion classification unit that classifies motion based on motion sensors. The Root patent does not disclose a motion classification unit that classifies motion based on motion sensors.

As indicated at the bottom of page 3 and the top of page 4 of the Office Action, the Examiner apparently is of the belief that speed is motion type. However, speed in and of itself does not indicate motion type. For example, speed indicates the speed of a person but does not indicate whether the person is engaging in any of the motion types shown in Figure 10 of the Root patent, i.e., running, bicycling, hiking/walking, skating, skiing, or other.

Indeed, even the Root patent recognizes that speed does not indicate motion type because, although the Root patent discloses determining speed, the user is still required to manually input motion type through the menu process.

Therefore, because the Root patent does not discloses that motion type is based on data from motion sensors, the Root patent does not anticipate independent claim 4.

Moreover, the only other place that motion type is arguably shown in the Root patent is in Figure 10 which presents the menus that the user can use to manually enter certain preferences into the device 101. One of these preferences is exercise type. Thus, Figure 10 suggests that exercise type is manually entered and is not based on motion sensors.

Therefore, the Root patent does not suggest the invention of independent claim 4. Accordingly, independent claim 4 would not have been obvious over the Root patent.

Because independent claim 4 is patentable over the Root patent, dependent claims 5, 6, and 9 are likewise patentable over the Root patent.

In addition, dependent claim 9 recites a filter that receives data from the motion classification unit and that provides an output to the motion classification unit and to the output unit.

On page 4 of the Office Action, the Examiner merely repeats the argument that column 7, lines 52-56 of the Root patent discloses the filter recited in dependent claim 9.

However, this portion of the Root patent merely states that a smart algorithm can filter out erroneous position points resulting from signal interference or from induced errors through the U.S. government's Selective Availability (SA) program, which intentionally limits the absolute accuracy of civilian GPS receivers.

Hence, there is no disclosure in this portion of the Root patent that this filtering is based on motion classification or that this filtering provides an output to both a motion classification unit and an output.

The Examiner asserts that the smart algorithm described in column 7, lines 52-56 of the Root patent receives data from the CPU and provides data back to the CPU. However, the Root patent discloses no such thing. Indeed, this smart algorithm could execute in the GPS receiver 604 and receive no input from the CPU.

Moreover, even if this smart algorithm resides in the CPU, the CPU of the Root patent is not a motion classification unit. At most, it is the user who is a "motion classification unit" because the user, not the CPU, classifies motion. Accordingly, even if the smart algorithm discussed in column 7, lines 52-56 is executed on the CPU, it does not receive data from the motion classification unit and provide an output to the motion classification unit as required by dependent claim 9.

Therefore, for all of these reasons, the Root patent does not anticipate dependent claim 9.

Furthermore, the filtering described in the Root patent is based on signal interference and errors purposely induced in the GPS system. Signal interference and errors purposely induced in the GPS system do not suggest filtering based on motion classification.

Therefore, the Root patent does not suggest the invention of dependent claim 9. Accordingly, dependent claim 9 would not have been obvious over the Root patent.

Independent claim 15 likewise recites motion classification based on sensed motion. As discussed above, the Root patent does not disclose or suggest using sensed motion in order to classify human motion.

Accordingly, independent claim 15 is not anticipated by and would not have been obvious over the Root patent.

Moreover, independent claim 15 recites the sensing of metabolism rate of a human and estimating energy expended by the human from the classified motion and from the metabolism rate. The Root patent does not disclose or suggest sensing metabolism or using metabolism with motion class to estimate expended energy.

For this reason also, independent claim 15 is not anticipated by and would not have been obvious over the Root patent.

Because independent claim 15 is patentable over the Root patent, dependent claims 16 and 17 are likewise patentable over the Root patent.

On pages 2 and 3 of the Office Action, the Examiner rejected claims 1, 2, 3, and 7 under 35 U.S.C. §103(a) as being unpatentable over the Root patent in view of the Foxlin patent.

Independent claim 1 requires, *inter alia*, (i) a motion classification unit that receives data from sensors and (ii) a Kalman filter that receives data from the motion classification unit and from the sensors, and

that provides an output to the motion classification unit and to an energy estimator unit.

As discussed above, the Root patent does not disclose or suggest motion classification based on information from sensors.

Similarly, the Foxlin patent does not disclose or suggest motion classification based on information from sensors.

Instead, the Foxlin patent discloses a sensor apparatus that senses yaw, pitch, and/or roll of a human body, particularly the head. The sensor apparatus can be used in virtual reality machines to track motion of a user's head. For such an application, the Foxlin patent does not suggest motion classification.

Accordingly, because neither the Root patent nor the Foxlin patent suggests sensor based motion classification to one of ordinary skill in the art, independent claim 1 is not unpatentable over the Root patent in view of the Foxlin patent.

Moreover, as the Examiner acknowledged at the bottom of page 4 carrying over to the top of page 5 of the Office Action, the Root patent does not disclose the use of a Kalman filter. Therefore, the Examiner argues that the Kalman filter described in the Foxlin patent

could be used in place of the smart algorithm described in column 7, lines 52-56 of the Root patent.

However, even if it would have been obvious to use a Kalman filter in place of the smart algorithm described in column 7, lines 52-56 of the Root patent, there is no disclosure in either the Root patent or the Foxlin patent to suggest that such a Kalman filter would receive data from a motion classification unit.

Indeed, as discussed above, there is no disclosure in the Root patent that the smart algorithm described in column 7, lines 52-56 of the Root patent receives data from the CPU. Also, there is no disclosure in the Foxlin patent that the Kalman filter receives data from a motion classification unit.

Accordingly, because neither the Root patent nor the Foxlin patent suggests a Kalman filter that receives motion classification data as well as sensor data, independent claim 1 is not unpatentable over the Root patent in view of the Foxlin patent.

Independent claim 2 recites sensors that sense a human, an energy estimator unit and a health monitor unit that receive data from the sensors, and a Kalman filter that receives data from the sensors and that

provides an output to the energy estimator unit and the health monitor unit.

As noted above, the Root patent does not disclose a Kalman filter. The Foxlin patent does disclose a Kalman filter but only for compensating for the drift of inertial sensors. The Foxlin patent does not disclose or suggest using a Kalman filter for providing inputs to an energy estimator unit and a health monitor unit.

Moreover, because the device 101 as disclosed in the Root patent does not rely on gyroscopes or other inertial sensors, it cannot be reasonable argued the Foxlin patent suggests any use of a Kalman filter for the device 101 disclosed in the Root patent.

Accordingly, because neither the Root patent nor the Foxlin patent suggests a Kalman filter that provides an output to an energy estimator unit and a health monitor unit, independent claim 2 is not unpatentable over the Root patent in view of the Foxlin patent.

Because independent claim 2 is patentable over the Root patent in view of the Foxlin patent, dependent claims 3 and 7 are likewise patentable over the Root patent in view of the Foxlin patent.

On page 3 of the Office Action, the Examiner rejected claims 8, 10, 11, 12, 13, and 14 under 35 U.S.C. §103(a) as being unpatentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

As discussed above, neither the Root patent nor the Foxlin patent discloses or suggests motion classification based on data from motion sensors. Moreover, the Examiner has not established that the Vock patent discloses or suggests motion classification based on data from motion sensors.

Accordingly, the Examiner has not made out a prima facie case that independent claim 4 is obvious over the Root patent, the Foxlin patent, and the Vock patent.

For this reason, independent claim 4 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

Because independent claim 4 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent, dependent claim 8 is likewise patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

Independent claim 10 requires a motion classification unit that processes data from inertial

sensors, an altimeter, and magnetic sensors to provide output data that identifies motion type and distance traveled.

As should be clear from above discussion, neither the Root patent nor the Foxlin patent discloses or suggests motion classification based on data from sensors. Moreover, the Examiner has not established that the Vock patent discloses or suggests motion classification based on data from sensors.

Accordingly, the Examiner has not made out a prima facie case that independent claim 10 is obvious over the Root patent, the Foxlin patent, and the Vock patent.

For this reason, independent claim 10 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

Because independent claim 10 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent, dependent claims 11, 12, and 13 are likewise patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

In addition, dependent claim 11 recites a human model that is provided as an input to a measurement

prefilter. The Root patent, the Foxlin patent, and the Vock patent do not either alone or in combination disclose inputting a human model into their respective systems.

The Examiner argues that input of a human model is inherently disclosed in the Root patent, the Foxlin patent, and the Vock patent. However, the Examiner points to no disclosure in any of these patents from which the Examiner can reasonably conclude that input of a human model is inherently disclosed in the Root patent, the Foxlin patent, and the Vock patent.

Accordingly, the Examiner has not established a prima facie case of inherency with respect to dependent claim 11. For this additional reason, dependent claim 11 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

Independent claim 14 requires a motion classification unit that processes data from inertial sensors, an altimeter, and magnetic sensors to provide output data that identifies motion type and distance traveled.

As discussed above, neither the Root patent nor the Foxlin patent discloses or suggests motion classification based on data from sensors. Moreover, the

Examiner has not established that the Vock patent discloses or suggests motion classification based on data from sensors.

Accordingly, the Examiner has not made out a prima facie case that independent claim 14 is obvious over the Root patent, the Foxlin patent, and the Vock patent.

For this reason, independent claim 14 is patentable over the Root patent in view of the Foxlin patent and further in view of the Vock patent.

On page 3 of the Office Action, the Examiner rejected claims 18 and 19 under 35 U.S.C. §103(a) as being unpatentable over the Root patent in view of Teller.

Dependent claim 18 (in combination with independent claim 4) is directed to a human motion classification and measurement system that includes a respiration sensor adapted for mounting on a human, motion sensors adapted for mounting on a human, a motion classification unit connected to receive data from the motion sensors and generate therefrom a motion type indicator signal, and an output unit connected to the respiration sensor and to receive the motion type

indicator signal. The output unit provides an output indicating a status of human activity of the human.

As discussed above, the Root patent does not disclose or suggest motion classification based on data from sensors. Moreover, the Examiner has not established that Teller discloses or suggests motion classification based on data from sensors.

Accordingly, the Examiner has not made out a prima facie case that dependent claim 18 is obvious over the Root patent and Teller.

For this reason, dependent claim 18 is patentable over the Root patent in view of Teller.

Dependent claim 19 (in combination with independent claim 4) is directed to a human motion classification and measurement system that includes a hydration sensor adapted for mounting on a human, motion sensors adapted for mounting on a human, a motion classification unit connected to receive data from the motion sensors and generate therefrom a motion type indicator signal, and an output unit connected to the hydration sensor and to receive the motion type indicator signal. The output unit provides an output indicating a status of human activity of the human.

As discussed above, the Root patent does not disclose or suggest motion classification based on data from sensors. Moreover, the Examiner has not established that Teller discloses or suggests motion classification based on data from sensors.

Accordingly, the Examiner has not made out a prima facie case that dependent claim 19 is obvious over the Root patent and Teller.

For this reason, dependent claim 19 is patentable over the Root patent in view of Teller.

Finally, at the bottom of page 5 and carrying over to the top of page 6 of the Office Action, the Examiner asserts that the terms "connected to," "so that," and "operable" are terms of use and not limitation. However, these terms characterize the nature of other terms in the claims and, therefore, are proper terms of limitation.

CONCLUSION

In view of the above, it is clear that the claims of the present application patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

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